AMENDMENTS TO THE CLAIMS

Pursuant to 37 C.F.R. § 1.121 the following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method for extending a dynamic range of a communication signal used in performing ~~an FFT~~ a Fast Fourier Transform ("FFT") process, comprising the steps of:

obtaining a first communication signal comprising a set of data points, the first communication signal having a set of signal characteristics;

enabling an output division of the data points at each output stage of the FFT process during a first communication signal transmission;

determining a maximum output communication signal sampled during the first communication signal transmission;

predicting a maximum output communication signal for a second signal transmission using the signal characteristics of the first communication signal during the first communication signal transmission;

calculating a number of unnecessary output divisions for each output stage of the FFT process during the second signal transmission using the number of unnecessary output divisions determined from the predicted maximum output communication signal in the predicting step and the maximum output communication signal sampled during the first communication signal transmission in the determining step; and

selectively disabling the output stage division for at least one output stage of the FFT process during the second signal transmission in accordance with the number of unnecessary output divisions determined in the calculating step.

2. (Previously Presented) A method as in claim 1, wherein the enabling step divides the communication signal data points utilizing a divide and conquer approach.

3. (Previously Presented) A method as in claim 2, wherein the divide and conquer approach is at least one of decimation in time and decimation in frequency.

4. (Previously Presented) A method as in claim 1, wherein the FFT process comprises at least one of a radix-2 butterfly FFT, radix-4 butterfly FFT, and a split-radix butterfly FFT process.

5. (Previously Presented) A method as in claim 1, wherein the FFT system comprises at least one of a fixed-point and integer FFT process.

6. (Previously Presented) A method as in claim 1, wherein the predicting step determines the maximum output signal for a second signal transmission according to the following relationship:

$$R = 2^{(M-1)-D-G-H}$$

wherein R represents a value approximately equal to or greater than the maximum output signal for the second signal transmission; M represents a number of bits in a data storage word; D represents a maximum difference in bit usage among a set of communication signals; G represents a maximum allowed gain change; and H represents headroom.

7. (Previously Presented) A method as in claim 6, wherein the predicting step further comprises sampling the first communication signal for M, D, G, and H values.

8. (Previously Presented) A method as in claim 6, wherein M, D, G, and H are fixed FFT process values.

9. (Previously Presented) A method as in claim 6, wherein H is approximately 0.5 bits.

10. (Previously Presented) A method as in claim 6, wherein M is approximately 16.

11. (Previously Presented) A method as in claim 6, wherein D is approximately 1.5 bits.

12. (Previously Presented) A method as in claim 6, wherein G is approximately 0.5 bits.

13. (Previously Presented) A method as in claim 1, wherein the calculating step determines the number of unnecessary output divisions for each output stage of the FFT process for the second signal transmission according to the following relationship:

$$s = floor\left(\log_2\left(\frac{R}{|B_m|}\right)\right)$$

wherein s represents the number of unnecessary output divisions for each output stage of the FFT process for the second signal transmission; R represents the predicted maximum output signal for a second signal transmission; B_m represents the maximum output communication signal sampled during the first signal transmission; and floor represents a function that returns an integer value.

14. (Currently Amended) A system for extending a dynamic range of a communication signal in ~~an FFT~~ a Fast Fourier Transform ("FFT") process, comprising:

an FFT module having a plurality of selectively disabled output stage divisions;

a shift control module connected to the output stage divisions of the FFT through a control line which disables the output stage divisions of the FFT; and

an optimized shift calculator connected to the shift control module through a command line, the optimized shift calculator determining a number of unnecessary output divisions and instructing the shift control module to disable corresponding number of output stage division;

wherein the optimized shift calculator determines the number of unnecessary output divisions according to the following relationship:

$$s = floor\left(\log_2\left(\frac{R}{|B_m|}\right)\right)$$

wherein s represents the number of unnecessary output divisions; B_m represents a maximum output communication signal sampled during a first signal transmission; R represents a predicted maximum output signal for a second signal transmission; and floor represents a function that returns an integer value.

15. (Previously Presented) A system as in claim 14, wherein R is determined according to the following relationship:

$$R = 2^{(M-1)-D-G-H}$$

wherein M represents a number of bits in a data storage word; D represents a maximum difference in bit usage among a set of communication signals; G represents a maximum allowed gain change; and H represents headroom.

16. (Previously Presented) A system as in claim 15, wherein M, D, G, and H are fixed FFT system values.

17. (Previously Presented) A system as in claim 14, wherein the control line of the shift control module disables each output division stage of the FFT module in a serial manner.

18. (Previously Presented) A system as in claim 14, wherein the shift control module further comprises at least two control-lines, a first control line for disabling a first output division stage and a second control line for disabling a second output division stage, wherein the first control line and the second control line disable each output division stage concurrently.

19. (Currently Amended) A method for extending a dynamic range of a communication signal used in ~~an FFT~~ a Fast Fourier Transform ("FFT") system having a set of output stage divisions, comprising the steps of:

calculating a number of unnecessary output divisions for each output stage of FFT system during a second signal transmission period using a maximum output communication signal sampled during a first communication signal transmission period and a number of unnecessary output divisions determined from a predicted maximum output communication signal for the second signal transmission; and

selectively disabling the output stage division far at least one output stage of the FFT system during a second signal transmission in accordance with the number of unnecessary output divisions determined in the calculating step.

20. (Currently Amended) A method as in claim 19, wherein the calculating step determines the number of unnecessary output divisions for each output stage of the FFT system for the second signal transmission period according to the following relationship:

$$\underline{s = floor\left(\log_2\left(\frac{R}{|B_m|}\right)\right)}$$

wherein s represents the number of unnecessary output divisions for each output state of the FFT system during the second signal transmission; R represents the predicted maximum output signal for a second signal transmission; B_m, represents the maximum output communication signal sampled during the first signal transmission; and floor represents a function that returns an integer value.

21. (Previously Presented) A method as in claim 19 wherein, the calculating step determines the maximum output signal for a second signal transmission according to the following relationship:

$$R = 2^{(M-1)-D-G-H}$$

wherein R represents a value approximately equal to or greater than the maximum output signal for the second signal transmission; M represents a number of bits in a data storage word; D represents a maximum difference in bit usage among a set of communication signals; G represents a maximum allowed gain change; and H represents headroom.